

Trend Study 28-1-03

Study site name: Three Creeks.

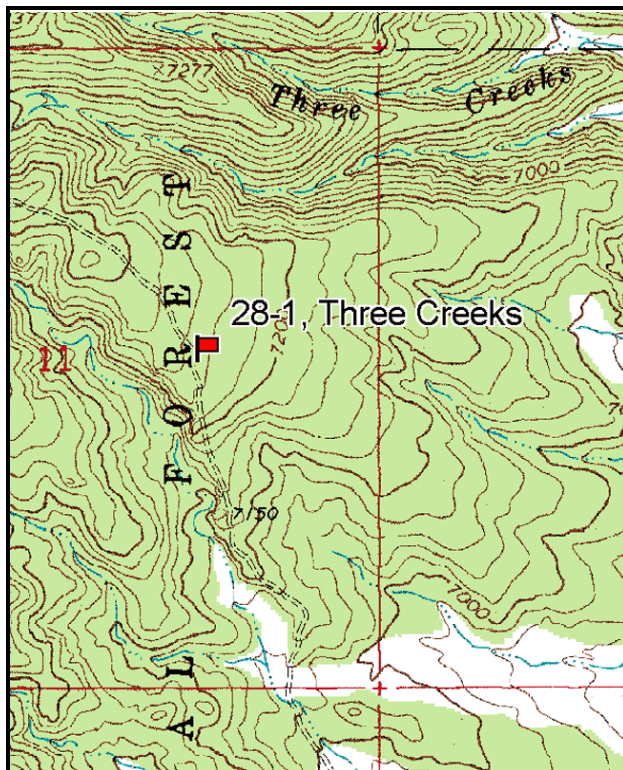
Vegetation type: Burn-Chained, Seeded P-J.

Compass bearing: frequency baseline 167 degrees magnetic.

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft). Rebar: belt 4 on 2ft, belt 2 on 1ft.

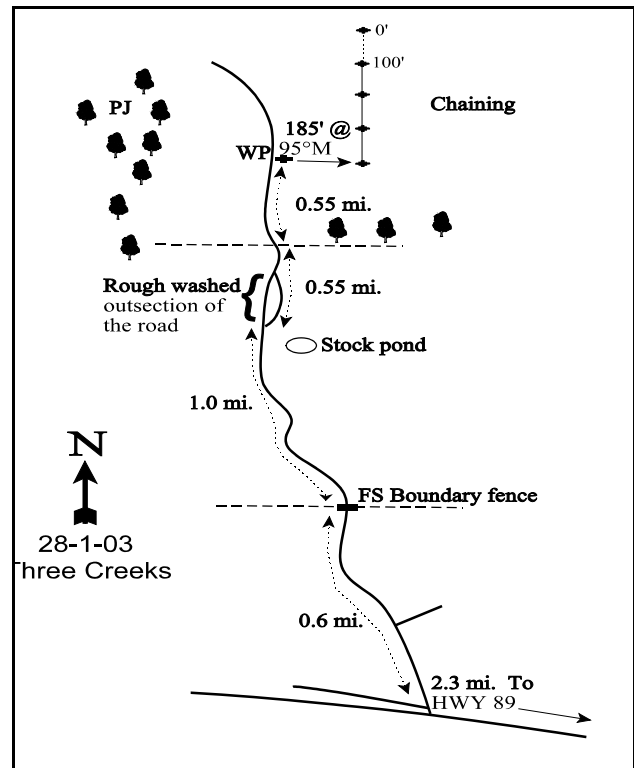
LOCATION DESCRIPTION

From the SR 20-US 89 junction, proceed south on US 89 for 3.1 miles to the Three Creeks road. Travel west on this road (do not take north fork by gate) for 0.5 miles to a fork. Bear right and go 1.85 miles to Three Forks taking the right most one. Travel 0.6 miles to a cattleguard. Continue 1.0 mile to a stockpond. Proceed up the washed out road for 0.55 miles to a fence taking a right fork at 0.3 miles. Continue 0.55 miles up to the chaining and to the witness post which is a short yellow fencepost. From the witness post by the road, walk 185 feet east to the 400-foot stake. The 0-foot baseline stake is 400 feet north, and the short green fencepost is marked by browse tag #7164.



Map Name: Panguitch NW

Township 33S, Range 6W, Section 11



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4201856 N, 369049 E

DISCUSSION

Three Creeks - Trend Study No. 28-1

This study is found on the northeast edge of the Markagunt Plateau. The transect lies at an elevation of 7,200 feet on a gentle 8% to 10% slope which drains easterly into the Sevier River. Numerous intermittent streams are nearby with a stock pond 1 mile to the south. The area is utilized by deer in light winters, by an expanding elk herd, and grazed in the summer by cattle. The study area was chained and seeded in 1967, and converted to a sagebrush-grass type with scattered pinyon and juniper trees. Due to an increase in the size of pinyon and juniper trees, a follow up treatment on these trees was done with chainsaws between 1987 and 1992. The site was also prescribed burned prior to the 2003 reading. Use of the site by wildlife was relatively low in 2003 at an estimated 15 deer and 9 elk days use/acre (38 ddu/ha and 21 edu/ha). Livestock use was estimated at 29 days use/acre (72 cdu/ha) in 2003. Deer and elk pellets appeared to be primarily from winter while cattle pats were from the previous grazing season.

The soil is tightly compacted with a high percentage of coarse fragments throughout the soil profile. Soil analysis indicates a sandy loam texture with a neutral pH (7.1). Both phosphorus and potassium could be limiting to vegetative growth and development with low values of 7.3 ppm for phosphorus and 28.8 ppm for potassium. Values of 10 ppm and 70 ppm respectively are thought to be minimal for normal plant development. During the 1987 reading, it was observed that the road and washes nearby showed signs of severe gully erosion and signs of minor sheet erosion on the study site. At that time, soil movement was detectable and some grasses were pedestalled. During the 1992 and 1998 surveys, no active gully erosion was observed and recent soil movement was not detected. In 2003, the proportion of the soil surface represented by bare ground was extremely high at 61%. Due to drought conditions, bare soil was loose and easily disturbed. Both vegetation and litter cover increased between 1992 and 1998, but decreased between 1998 and 2003. Even with the increase in bare ground and the corresponding decline in protective cover from vegetation and litter, soils were rated as stable in 2003 from an erosion condition class assessment.

Mountain big sagebrush is the dominant shrub species, although hybridization with basin big sagebrush is occurring on the site making identification difficult. In 1987, most of the sagebrush was classified as basin big sagebrush while the majority of the sagebrush was determined to be mountain big sagebrush in all other surveys. The mountain big sagebrush population declined to an estimated 700 plants/acre in 2003, much lower than the previous estimates of 1,760 plants/acre in 1992 and 1,340 in 1998. The decline in mountain big sagebrush in 2003 was due to a large decline in the number of young plants in the population as well as an increase in the number of dead. Some of the dead plants that were sampled in the density strips had been burned. In 1987 and 1992, utilization was moderate with a few individual plants displaying heavy hedging. In 1998 and 2003, utilization was mostly light. Vigor has been normal for most of the population in all surveys, and percent decadence increased to 26% in 2003, it's highest level in any reading. Mountain big sagebrush leaders had averaged 1.3 inches of annual growth when the site was read in late June 2003. Basin big sagebrush density was estimated at about 100 plants/acre in 1992 and 1998 although none of the sagebrush on the site was classified as basin big sagebrush in 2003.

Another important browse species on the site is bitterbrush, although density is very low at around 100 plants/acre. The bitterbrush population has shown moderate to heavy utilization in all readings and low reproduction. Vigor has been good except in 1992 when 67% of the population was classified with poor vigor. Percent decadence was estimated at 25% in 2003 while no decadent plants were sampled in any other year. Broom snakeweed, a subshrub that is considered an increaser, was very abundant 1987 and 1992 but less so in 1998 and 2003. Pinyon and juniper trees are scattered throughout the site. Point-center quarter data from 1992 estimated 53 pinyon trees/acre and 43 Utah juniper trees/acre. Fifty-five percent of the junipers sampled were tipped trees that were still growing. These were taken out during the followup chainsaw treatment. In 1998, tree density was estimated at 42 juniper trees/acre and 59 pinyon trees/acre. Tree density

declined in 2003 to an estimated 25 juniper and 34 pinyon trees/acre. Several trees had been killed by fire resulting in decreased tree density on the site.

The herbaceous understory is dominated by crested wheatgrass, which was seeded onto the site as part of the original chaining treatment. Crested wheatgrass maintained a high nested frequency value during the first 3 readings, but significantly declined in 2003. Crested wheatgrass was moderately utilized in 1998, but showed no sign of use in 2003. Several other perennial grasses have been sampled on the site including intermediate wheatgrass, western wheatgrass, blue grama, Indian ricegrass, bottlebrush squirreltail, and needle-and-thread grass. These species are important but occur in limited densities. Cheatgrass was encountered in 1 quadrat in 1998, but was not sampled in any other year. Forb diversity is high, but most species are rare. Silvery lupine is the most abundant forb on the site, and it has accounted for the majority of the forb cover in all readings. Other important perennial forbs include lobeleaf groundsel, longleaf phlox, and scarlet globemallow.

1987 APPARENT TREND ASSESSMENT

Fourteen percent of the ground cover on the site comes from erosion pavement and a few larger rocks. Vegetative cover is scattered, but litter covers 54% of the soil surface while bare soil has a cover value of 26%. Erosion is evident, yet not a serious problem on the site. Sagebrush is well established on the site and should increase. Seeded grasses are also well established but forbs are deficient.

1992 TREND ASSESSMENT

Visual observations of the site indicate stable soil conditions with no active gullies or recent soil movement. Bare ground, mostly the result of livestock trampling, has increased since the last reading from 26% to 35%. Trend for soil is stable. The key browse species are basin big sagebrush and mountain big sagebrush. Their combined density has increased substantially since 1986, but this was because of the larger sample size which gives much better estimates of browse densities. Age structure for the sagebrush species are good with acceptable percentages of decadency. The browse trend is up. Nested and quadrat frequencies of perennial grasses have increased while those of forbs have declined. Overall trend for herbaceous understory is up.

TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up (5)

1998 TREND ASSESSMENT

The soil trend continues to be stable. Vegetation and litter cover have increased slightly while percent bare ground and percent rock and pavement cover combined have decreased slightly. Percent bare ground is still quite high and there is still some erosion potential during moderate to intense rain events. The browse trend is stable. The mountain big sagebrush population density has decreased slightly since 1992 with only a few dead plants encountered in 1998. The age structure has changed very little since 1992 with a mostly mature population and moderate recruitment by the young age class. The bitterbrush population is also stable and exhibits moderate to heavy hedging. Broom snakeweed density has greatly declined since 1992, probably due to annual precipitation patterns. Although the density of pinyon pine and Utah juniper is currently similar to that reported in 1992, the trees have increased in size and will continue to do so to the point it will become more dominate on the site in the future. As these trees increase in size and dominance, the herbaceous understory and browse component will slowly decrease as canopy cover increases. The herbaceous understory trend is stable. Crested wheatgrass dominates the site with a significant increase of nested frequency since 1992. Perennial grass sum of nested frequency has changed little since 1992. Perennial forb sum of nested frequency shows a slight increase, but forbs are currently a minor component of the herbaceous understory.

TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

2003 TREND ASSESSMENT

Trend for soil is down. Bare soil increased from 30% to 61%, and vegetation and litter cover both declined. Erosion remains low due to drought for several years, but the potential for erosion is high especially during severe thunderstorms. Trend for browse is down. Mountain big sagebrush density declined from 1,340 plants/acre in 1998 to 700 in 2003, and percent young which was moderately high in both 1992 and 1998 declined to only 6% of the population. Decadence increased from 1% in 1998 to 26% in 2003. Bitterbrush density remains stable, but this species is in low abundance on the site. Bitterbrush continues to show moderate to heavy use. The herbaceous understory has a downward trend as perennial grass sum of nested frequency declined 58%. Five of the perennial grass species that were sampled on the site significantly declined in nested frequency in 2003, most notably crested wheatgrass. Perennial forbs remain limited on the site.

TREND ASSESSMENT

soil - down (1)

browse - down (1)

herbaceous understory - down (1)

HERBACEOUS TRENDS --

Management unit 28 , Study no: 1

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
G	Agropyron cristatum	c288	b216	c281	a107	12.81	17.80	3.30
G	Agropyron intermedium	b45	c143	b60	a7	4.77	1.26	.02
G	Agropyron smithii	a-	b39	b35	b52	1.27	.66	.84
G	Agropyron spicatum	-	4	8	-	.63	.05	-
G	Bouteloua gracilis	a27	b53	ab51	a28	2.32	.62	.51
G	Bromus tectorum (a)	-	-	2	-	-	.00	-
G	Carex spp.	a3	ab12	b22	a-	.27	.31	-
G	Elymus junceus	-	4	-	-	.06	-	-
G	Oryzopsis hymenoides	a-	c27	b12	ab3	.63	.06	.01
G	Poa fendleriana	a-	a4	b13	a1	.03	.06	.00
G	Poa secunda	-	-	4	3	-	.01	.00
G	Sitanion hystrix	a-	ab6	b14	a-	.33	.10	-
G	Stipa comata	9	7	6	13	.24	.22	.28
Total for Annual Grasses		0	0	2	0	0	0.00	0
Total for Perennial Grasses		372	515	506	214	23.39	21.17	5.00
Total for Grasses		372	515	508	214	23.39	21.17	5.00

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'98	'03	'92	'98	'03
F	Alyssum alyssoides (a)	-	-	3	-	-	.00	-
F	Amaranthus spp.	-	-	-	3	-	-	.03
F	Arabis spp.	_b 11	_a -	_a -	_a -	-	-	-
F	Astragalus argophyllus	1	-	-	-	-	-	-
F	Astragalus convallarius	-	-	2	5	-	.03	.06
F	Astragalus spp.	2	1	-	-	.00	-	-
F	Castilleja chromosa	-	3	3	3	.03	.03	.03
F	Calochortus nuttallii	-	-	-	1	-	-	.00
F	Cryptantha fulvocanescens	_b 15	_{ab} 13	_a 5	_a -	.07	.04	.00
F	Cymopterus spp.	-	-	-	-	-	-	.00
F	Descurainia spp. (a)	-	_b 16	_a -	_a -	.23	-	-
F	Draba spp. (a)	-	-	1	-	-	.00	-
F	Erigeron pumilus	4	-	-	-	-	-	-
F	Ipomopsis aggregata	7	3	-	-	.00	-	-
F	Lappula occidentalis (a)	-	-	3	1	-	.00	.00
F	Lomatium spp.	-	-	-	2	-	-	.03
F	Lupinus argenteus	_b 46	_b 49	_b 51	_a 18	2.59	2.61	2.07
F	Lygodesmia spinosa	-	2	2	5	.00	.03	.30
F	Machaeranthera canescens	3	-	4	-	-	.01	-
F	Penstemon spp.	11	5	4	-	.06	.00	-
F	Phlox longifolia	_a 8	_{ab} 11	_c 39	_{bc} 25	.08	.17	.08
F	Polygonum douglasii (a)	-	-	3	-	-	.01	-
F	Senecio integerrimus	-	-	-	1	-	-	.00
F	Senecio multilobatus	_{ab} 13	_a 4	_a 3	_b 30	.01	.03	.39
F	Sphaeralcea coccinea	-	6	5	6	.09	.01	.09
F	Streptanthus cordatus	3	-	-	1	-	-	.00
F	Tragopogon dubius	-	-	-	-	-	.00	-
F	Trifolium spp.	-	-	1	-	-	.00	-
F	Unknown forb-annual (a)	-	2	-	-	.03	-	-
F	Unknown forb-perennial	-	3	6	-	.00	.01	-
F	Zigadenus paniculatus	-	-	-	1	-	-	.00
Total for Annual Forbs		0	18	10	1	0.26	0.03	0.00
Total for Perennial Forbs		124	100	125	101	2.96	3.00	3.12
Total for Forbs		124	118	135	102	3.22	3.03	3.12

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 28 , Study no: 1

Type	Species	Strip Frequency			Average Cover %		
		'92	'98	'03	'92	'98	'03
B	Artemisia nova	1	1	0	-	.00	-
B	Artemisia tridentata tridentata	5	5	0	2.77	1.29	-
B	Artemisia tridentata vaseyana	33	45	23	4.02	6.34	2.74
B	Chrysothamnus viscidiflorus viscidiflorus	1	1	1	-	.00	-
B	Gutierrezia sarothrae	53	24	44	.51	.42	1.18
B	Juniperus osteosperma	6	4	1	1.13	.84	-
B	Opuntia spp.	12	5	9	.33	.06	.06
B	Pinus edulis	5	6	0	.15	.18	1.00
B	Purshia tridentata	2	5	4	.18	.68	.01
Total for Browse		118	96	82	9.11	9.83	4.99

CANOPY COVER, LINE INTERCEPT --

Management unit 28 , Study no: 1

Species	Percent Cover
	'03
Artemisia tridentata vaseyana	5.01
Gutierrezia sarothrae	.88
Pinus edulis	.13

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 28 , Study no: 1

Species	Average leader growth (in)
	'03
Artemisia tridentata vaseyana	1.3

POINT-QUARTER TREE DATA --

Management unit 28 , Study no: 1

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	41	25
Pinus edulis	59	34

Average diameter (in)	
'98	'03
2.7	3.2
1.6	1.9

BASIC COVER --

Management unit 28 , Study no: 1

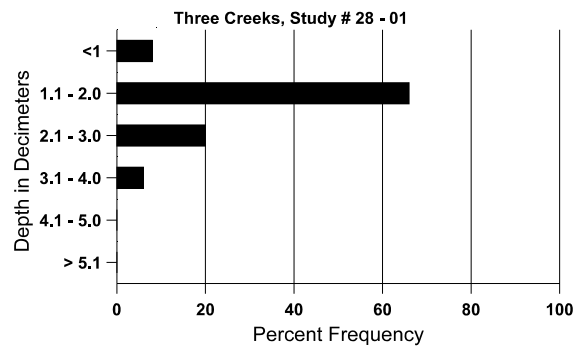
Cover Type	Average Cover %			
	'87	'92	'98	'03
Vegetation	4.75	31.85	35.06	13.53
Rock	3.25	12.85	3.88	3.44
Pavement	11.00	0	5.90	2.87
Litter	54.25	36.66	46.38	27.10
Cryptogams	.75	.03	.25	.00
Bare Ground	26.00	35.43	30.17	61.03

SOIL ANALYSIS DATA --

Management unit 28, Study no: 1, Study Name: Three Creeks

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	ds/m
13.7	62.7 (14.6)	7.1	54.2	38.0	7.8	2.2	7.3	28.8	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 28 , Study no: 1

Type	Quadrat Frequency		
	'92	'98	'03
Rabbit	61	29	31
Elk	-	7	15
Deer	18	18	15
Cattle	5	16	22

Days use per acre (ha)	
'98	'03
-	-
9 (22)	9 (22)
11 (27)	15 (38)
45 (111)	29 (72)

BROWSE CHARACTERISTICS --

Management unit 28 , Study no: 1

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	40	-	-	40	-	-	0	100	-	0	-/-
98	20	-	-	20	-	-	0	0	-	0	18/30
03	0	-	-	-	-	-	0	0	-	0	-/-
<i>Artemisia tridentata tridentata</i>											
87	399	33	133	266	-	-	67	17	0	0	31/31
92	100	-	60	20	20	-	20	0	20	0	-/-
98	120	-	40	80	-	-	0	0	0	0	44/64
03	0	-	-	-	-	-	0	0	0	0	-/-
<i>Artemisia tridentata vaseyana</i>											
87	33	-	-	33	-	-	100	0	0	0	9/11
92	1760	20	620	920	220	-	67	8	13	2	-/-
98	1340	20	400	920	20	160	10	0	1	0	22/30
03	700	-	40	480	180	460	11	6	26	6	20/28
<i>Chrysothamnus viscidiflorus viscidiflorus</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	20	-	-	20	-	-	0	0	-	0	-/-
98	20	-	-	20	-	-	0	0	-	0	19/42
03	20	-	-	20	-	-	0	0	-	0	19/27
<i>Gutierrezia sarothrae</i>											
87	5132	-	366	4700	66	-	0	0	1	0	9/9
92	4300	320	2040	2260	-	-	0	0	0	0	-/-
98	900	120	160	720	20	-	0	0	2	0	9/7
03	1640	-	60	1280	300	740	0	0	18	5	9/9
<i>Juniperus osteosperma</i>											
87	0	-	-	-	-	-	0	0	-	0	-/-
92	120	-	80	40	-	-	0	0	-	0	-/-
98	80	-	60	20	-	80	0	0	-	0	-/-
03	20	-	20	-	-	140	0	0	-	0	-/-
<i>Leptodactylon pungens</i>											
87	333	-	-	333	-	-	0	0	-	0	6/7
92	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	6/10
03	0	-	-	-	-	-	0	0	-	0	7/9

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Opuntia spp.											
87	266	-	33	233	-	-	0	0	0	13	4/14
92	400	-	80	240	80	-	0	0	20	20	-/-
98	140	-	-	120	20	20	0	0	14	0	5/8
03	220	-	-	220	-	-	0	0	0	0	6/11
Pinus edulis											
87	33	-	33	-	-	-	0	0	-	0	-/-
92	100	-	80	20	-	-	0	40	-	0	-/-
98	120	-	80	40	-	-	0	0	-	0	-/-
03	0	-	-	-	-	60	0	0	-	0	-/-
Purshia tridentata											
87	66	-	-	66	-	-	0	100	0	0	6/18
92	60	-	-	60	-	-	0	33	0	67	-/-
98	100	-	20	80	-	-	60	20	0	0	15/27
03	80	-	-	60	20	-	25	75	25	0	7/24